

Attachment 3—National Weather Service Gauge Descriptions and River
Stage Data

Attachment 3--National Weather Service Gauge Description and
Corrigenda, Congaree at Columbia (Volume numbers appear on the copies)

The danger-line is at 12 feet.

The lowest water is 1.0 foot.

The highest water, 27 feet, occurred November 27, 1877.

CLINTON, TENN.

Clinton, Tenn., is on the Clinch River. The width of river at low water is 282 feet.

The drainage area above the place is 2,750 square miles.

The distance to next station below, Kingston, is 46 miles; to Chattanooga, 210 miles.

The river gauge is attached to middle pier of the East Tennessee, Virginia, and Georgia Railroad bridge over the Clinch River. It is made of heart pine, 4 X 10-inch.

The gauge extends 48 feet above the zero.

The bench mark is base of rail on bridge. It is 57.65 feet above the zero of gauge.

The zero of gauge is 782.3 feet above sea level.

The depth of water in channel at a zero stage is 0.7 of a foot.

The danger-line is at 25 feet.

There are large mining and sawmill interests in vicinity. Floods are sudden. A knowledge of coming high water is of great importance.

The lowest water is 0.3 foot.

The highest known water, 45 feet, occurred March 31, 1886.

COLBERT, IND. T.

Colbert, Ind. T., is on the Red River. The width of the river at low water is 225 feet.

The drainage area above it is 37,500 square miles.

There is a bridge at the place.

The distance to Arthur City, below, is 115 miles.

The danger-line is at 14 feet.

The base of rail on bridge is 44 feet above the zero of the gauge.

The highest water known is 18 feet.

COLUMBIA, S. C.

Columbia, S. C., is at the junction of the Broad and Saluda rivers.

The drainage area above it is 7,300 square miles.

The distance to Wateree, below it, is 42 miles, about 5 miles up the Wateree.

The lowest water is 1.1 feet.

COLUMBIA, TENN.

Columbia, Tenn., is on the Duck River. The width of the river at low water is 150 feet.

The drainage area above it is 1,100 square miles.

The distance to Johnsonville, below it, is 76 miles.

The river gauge is on the down-stream end of the south pier of the Columbia and Nashville Turnpike Company's bridge over Duck River.

The length of gauge above zero is 43 feet.

The bench mark is top of step at south entrance to courthouse. It is 87.4 feet above the zero of the gauge.

The zero of gauge is 519.4 feet above sea level.

The depth of water below zero is 0.3 of a foot.

The danger-line is at 28 feet.

The lowest water is 0.4 foot below zero of gauge.

The highest known water, 33.0 feet, occurred March 8, 1891.

At Centerville, 30 miles below Columbia, the low water discharge is 1,270 cubic feet a second.

Columbia, Va., is on the James River.

The width of the river at low water is at

The distance to Richmond, below it, is 1

The drainage area above it is 5,800 squa

The river gauge, 750 feet below the mouth, extending from 2 feet below the zero to the first, from 0 to 2 feet below, is on the slo the second, from 0 to 15 feet, is vertical, and the flow of water from the pump to the large road; the third extends vertically from 15 to work of the pump; the fourth, from 17 to 34 the fifth, from 30 to 42 feet, vertical, is located tank, extending to the bottom of it.

The bench mark is a large spike driven in and is at the same level as the top of the railroad depot.

The zero of gauge is 29.85 feet below the

The zero of gauge is 223.151 feet above s

At a zero stage the depth of water is 5 to

The danger-line is at 18 feet. At this s

The highest known water, 40.02 feet (39 tember 30, 1870.

The highest waters above low water, are 36; 1886, 30.3; and 1889, 32.5.

The lowest water, 1.5 feet below the zero

Columbus, Ga., is on the Chattahoochee

The distance to Eufaula, Ala., below it,

The drainage area above it is 4,900 square

The river gauge is set in two sections: side of brick pier in river near the east bank to pier on east bank. Duplicate gauge, read pile about midway of the wharf at Columbus

The top of the stone foundation of pier zero of the gauge.

The top of capstone, under side of lower

Columbus, Miss., is on the Tombigbee R

The drainage area above it is 4,300 square

There is a bridge at the place.

The distance to Demopolis, below it, is

The danger-line is at 33 feet.

The lowest water is 0.0.

The highest known water, 42 feet, occurred

Colusa, Cal., is on the Sacramento River

CLARKSVILLE, VIRGINIA.

Clarksville, Va., is on the Roanoke River, 65 miles above Weldon, N. C. The width of river at low water is 1,260 feet. The drainage area above the station is 6,900 square miles.

The river gauge is on the south side of river; it is made of 2 by 10 inch plank, and graduated with copper tacks and figures. It is attached to a tree leaning over the river.

Graduation is from 3 feet below to 23 above zero. Tradition gives a high water of 27 feet on November 27, 1877. Highest water recorded was 13.5 feet on September 14, 1893; lowest, -0.2, on July 19, 1894. Danger line is at 12 feet.

CLINTON, TENNESSEE.

Clinton, Tenn., is on the Clinch River, 46 miles above its mouth at Kingston, Tenn. The width of river at low water is 282 feet. The drainage area above the station is 2,750 square miles.

The river gauge is attached to the middle pier of the Southern Railroad bridge over the Clinch River. It is made of heart pine, 4 by 10 inches, in two sections, the first from zero to 5 feet, and the second from 5 to 48 feet; it is painted white and graduated in copper tacks.

The base of rail on bridge is 57.66 feet above zero of gauge.

Graduation is from zero to 48 feet above zero. Highest water was 45 feet on March 31, 1886; lowest, 0.0, on December 4-8, 1883. Danger line is at 25 feet.

COLBERT, INDIAN TERRITORY.

Colbert, Ind. T., is on the Red River, 115 miles above Arthur City, Tex. The width of the river at low water is 225 feet. The drainage area above the station is 37,500 square miles.

The base of rail on bridge is 44 feet above zero of gauge.

Highest water was 18 feet, date unknown. Danger line is at 14 feet.

Station was discontinued September 15, 1893.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C., is at the head of the Congaree River, 37 miles above its confluence with the Wateree. The distance to St. Stephens, on the Santee, is 102 miles. The drainage area above the station is 7,300 square miles.

The river gauge is painted on the first stone pier (from the eastern shore) of the Gervais street toll bridge.

Bench mark is track of the South Carolina and Georgia Railroad at Union depot. Its elevation is 102.59 feet above zero of gauge.

Graduation is from zero to 26.6 feet above zero. Highest water was 34.4 feet in September, 1852; lowest, -0.4, on January 20, 1893. Danger line is at 15 feet.

COLUMBIA, TENNESSEE.

Columbia, Tenn., is on the Duck River, 66 miles above its mouth and 76 miles above Johnsonville, Tenn., on the Tennessee River. The width of river at low water is 150 feet.

The drainage area above the station is 1,100 square miles.

The river gauge is on the downstream end of the south pier of the Columbia and Nashville Turnpike Company's bridge over Duck River. It was rebuilt in 1891 by the Weather Bureau, and consists of a 10-inch board bolted to the pier.

Bench mark is top of step at south entrance of courthouse, and is 87.4 feet above zero of gauge.

Graduation extends 43 feet above zero. Highest water was 33.1 feet on March 9, 1891; lowest, -0.4, date unknown. Danger line is at 28 feet.

CLARION, PENNSYLVANIA. VI

Clarion, Pa., is on the Clarion River, 21 miles above its mouth, and 24 miles above Parker, Pa., on the Allegheny. The width of river at low water is 162 feet. The drainage area above the station is 865 square miles.

The river gage is on the north abutment of the Clarion County bridge over Clarion River. The gage is partly on the abutment and partly on a natural rock (the foundation of the abutment), and has a stone, 4.5 feet in length, planted at the foot of the natural rock, sunk flush with the water line as it stood when the gage was put up, the top surface of the planted stone being the zero of gage. Graduation is painted on the stone. Bridge was rebuilt in 1894, and the gage partially destroyed thereby. Zero of gage is 25.6 feet below top line of the abutment, and about 1,052 feet above mean sea level.

Graduation is from 3 feet below to 22 feet above zero. Highest water was 15.2 feet on May 21, 1894; lowest, -1.4 feet on September 4, 5, 1894. Danger line is at 10 feet.

CLARKSVILLE, VIRGINIA.

Clarksville, Va., is on the Roanoke River, 155 miles from its mouth, and 65 miles above Weldon, N. C. The drainage area above the station is 7,344 square miles.

The United States Geological Survey gage on the Dan River is now used as the official gage. The graduation rod is fastened to the guard rail of the third span west of the Southern Railway bridge. The distance from the zero of the rod to the outside of the pulley wheel is 3 feet; the length of the wire rope about 33 feet.

Tradition gives a height of 27 feet on November 27, 1877; the highest water recorded was 17 feet on March 21, 1899; lowest, -0.4 foot on September 13-17, and 21, 1897. Danger line is at 12 feet.

CLINTON, TENNESSEE.

Clinton, Tenn., is on the Clinch River, 46 miles above its mouth at Kingston, Tenn. The width of river at low water is 282 feet. The drainage area above the station is 2,750 square miles.

The river gage is attached to the middle pier of the Southern Railway bridge over the Clinch River. It is made of heart pine, 4 by 10 inches, in two sections, the first from zero to 5 feet, and the second from 5 to 48 feet; it is painted white and graduated in copper tacks. The base of rail on bridge is 57.7 feet above zero of gage and 840 feet above mean sea level.

Graduation is from zero to 48 feet above. Highest water was 45 feet on March 31, 1886; lowest, 0.0, on December 4-8, 1883. Danger line is at 25 feet.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C., is on the Congaree River, 37 miles above its confluence with the Wateree. The distance to St. Stephens, on the Santee, is 102 miles. The drainage area above the station is 7,300 square miles.

The river gage is located on the southwest corner of the third granite pier from the eastern end of the Gervais street bridge over the Congaree River, 425 feet from the eastern bank. The last 7 feet of the supporting structure is of wood, securely fastened to the top of the granite pier. It is a standard Weather Bureau brass gage, and the face of the gage is flush with the surface of the pier.

The bench mark is the top of the rail of the South Carolina and Georgia Railroad at the union depot on Gervais street. It is 102.6 feet above the zero of the gage and 336 feet above mean sea level.

The graduations in feet are painted on the granite pier from zero to 28 feet; from 29 to 35 feet they are painted on the gage. The graduations extend from 0.4 foot below to 34.7 feet above zero. Highest water was 34.4 feet in September, 1852; lowest, -0.4 foot on January 20, 1893. Danger line is at 15 feet.

COLUMBIA, TENNESSEE.

Columbia, Tenn., is on the Duck River, 66 miles above its mouth, and 76 miles above Johnsonville, Tenn. The width of river at low water is 150 feet. The drainage area above the station is 1,100 square miles.

The river gage is on the north side of the Columbia and Nashville Turnpike Company's bridge over Duck River. It belongs to the Weather Bureau, and consists of 1½ by 2 inch oak timber and is attached to the pier. It is painted white with black graduations.

The bench mark is the top of step at south entrance of court-house, and is 87.4 feet above the zero of gage and 606.8 feet above mean sea level.

Graduation is from zero to 38 feet above. Highest water was 33.2 feet on March 9, 1891; lowest, -0.4 foot, date unknown. Danger line is at 28 feet.

COLUMBIA, VIRGINIA.

Columbia, Va., is on the James River, 167 miles from its mouth, and 57 miles above Richmond, Va. The width of river at low water is about 1,000 feet. The drainage area above the station is 5,800 square miles.

The river gage, 750 feet below the mouth of the Rivanna River, is built in five sections; the first, from zero to 2 feet below zero, is on the sloping bank in front of the Chesapeake and Ohio depot; the second, from zero to 15 feet, is vertical, and is located in the mouth of the small ravine formed by the flow of water from the pump to the large supply water tank of the Chesapeake and Ohio Railroad; the third extends vertically from 15 to 17 feet, and is located on the south side of the framework of the pump; the fourth, from 17 to 30 feet, is vertical and located on the north side of the framework; the fifth, from 30 to 42 feet, vertical, is located against the framework of the large supply water tank, extending to the bottom of it. The gage is built of 2 by 12 inch wood with galvanized iron facing, and is the property of the railroad company.

The bench mark is a large spike driven in the west side of a large sycamore tree in front of depot, and is at the same level as the top of the rail of the Chesapeake and Ohio Railroad in front of the depot. Elevation is 29.8 feet above zero of gage and 206 feet above mean sea level.

Graduation is from 2 feet below to 42 feet above zero. Highest water was 40 feet on September 30, 1870; lowest, -1.5 feet on October 25, 1892. Danger line is at 18 feet.

COLUMBUS, GEORGIA.

Columbus, Ga., is on the Chattahoochee River, 140 miles from its mouth, and 50 miles above Eufaula, Ala. The drainage area above the station is 4,900 square miles.

The river gage is set in two sections; the first, from -2 to 20 feet, is nailed on downstream side of brick pier in river, near the east bank; the second, from 20 feet upward, is fastened to pier on east bank. Duplicate gage, reading from -1 to 9 feet, is fastened to the face of a pile about midway of the wharf.

The top of the stone foundation of pier in river at its southeast corner is 18.6 feet above zero of gage. The top capstone, under side of lower chord of bridge, is 44.7 feet above zero of gage.

Graduation is from 2 feet below zero. Highest water was 60 feet in March, 1886; lowest, -1.5 feet on October 10-16, 18, 1897. Danger line is at 20 feet.

Station was discontinued on October 31, 1898.

Graduation extends from zero to 30 feet above. Highest water was 24 feet, on April 21, 1874; lowest, 4 feet, on June 1, 1904. Danger line is at 14 feet.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C. River observations began October 1, 1891. Is on the Congaree River, 52 miles above its confluence with the Wateree. The distance to St. Stephens, S. C., on the Santee River, is 102 miles. The width of the river at average low water is 1,112 feet. The drainage area above the station is 7,815 square miles.

A new chain and weight river gage of the United States Geological Survey pattern was installed by the Weather Bureau on October 1, 1904. It is located on the Gervais street highway bridge, near the fourth pier from the east side. The Weather Bureau brass gage is still attached to the third pier, the new gage being used more particularly for low-water readings.

Top of rail at main line crossing of Atlantic Coast Line at Gervais street is 102.6 feet above zero of the gage, and 222 feet above mean sea level.

Graduation on the brass gage extends from 0.4 foot below to 34.7 feet above zero, and on the chain and weight gage from 3 feet below zero to as many feet above as may be necessary. Highest water was 34.4 feet, in September, 1852; lowest, -3 feet, on October 5-11, 1904. Danger line is at 15 feet.

COLUMBIA, TENNESSEE.

Columbia, Tenn. Established November 1, 1886. Is on the Duck River, 66 miles from its mouth and 76 miles above Johnsonville, Tenn., on the Tennessee River. The width of the river at average low water is 150 feet. The drainage area above the station is 1,207 square miles.

The river gage, which belongs to the Weather Bureau, is attached to the north side of the pier of the Columbia and Nashville turnpike bridge over Duck River, and is in two sections. The first section (0 to 42 feet) is made of 2 by 14 inch oak timber and is bolted to the stone pier. The second section (42 to 46 feet) is made of 2 by 8 inch white-oak timber. It is extended above and is fastened to the pier with a brace rod. Both sections are painted white with black graduations.

Top of stone step at south entrance to court-house is 87.4 feet above zero of the gage, and 606.8 feet above mean sea level.

Graduation extends from zero to 46 feet above. Highest water was 45.6 feet, on March 30, 1902; lowest, -0.4 foot, date unknown. Danger line is at 28 feet.

COLUMBIA, VIRGINIA.

Columbia, Va. Established July 1, 1898. Daily observations were commenced on July 1, 1904. Is on the James River, 167 miles from its mouth and 56 miles above Richmond, Va. The width of the river at average low water is 1,000 feet. The drainage area above the station is 5,800 square miles.

The river gage, which belongs to the Weather Bureau, is located about 750 feet below the mouth of the Rivanna River. It is made of 2 by 12 inch oak timber, and is in four sections. The first section (0 to 15 feet) is fastened by a cross-tie to a tree at the mouth of the gully, about 100 feet west of the Chesapeake and Ohio Railway depot, and the second section (15 to 17 feet) to the south side of the wooden framework, about 50 feet north of the first section. The third section (17 to 30 feet) is attached to the opposite side of the framework to which the second section is attached. The fourth section (30 to 42 feet) is attached to the southeast wooden upright support of the railroad water tank. Graduations are in brass figures and copper tacks.

Top of rail in front of Chesapeake and Ohio Railway depot is 29.8 feet above zero of the gage, and 206 feet above mean sea level.

The river gage is in two sections. The first section (0 to 8.2 feet) is screwed to a 4-inch plank bolted to the breakwater wall in the north end of the forebay of the works of the Cohoes Water Company. The second section (8.2 to 12 feet) is set on the gatehouse, over the arches to the gates in the south end of the forebay elevator. Both sections are made of 1 by 7 inch pine timber, painted white with black graduations.

U. S. W. B. B. M. No. 11, bronze tablet set in top course of end stone of retaining wall at southwest corner of gatehouse of Cohoes Water Company, is 9 feet above zero of the gage, and 162.5 feet above mean sea level.

Graduation extends from zero to 12 feet above. Highest water since establishment of station was 7.8 feet, on August 18, 1904; lowest, -0.2 foot, on September 27, 1908. Flood stage is at 5 feet.

COLGATE (P. O., DOBBINS), CALIFORNIA.

Colgate, Cal. Established October 1, 1904. Is on the Yuba River, near the junction of the Middle and North forks, and 28 miles above Marysville, Cal., at the mouth of the river. The width of the river at average low water is 200 feet. The drainage area above the station is 2,372 square miles.

The river gage consists of two vertical sections. The first section (0 to 5 feet) is anchored to rocks on the right bank of the river, opposite the power house of the California Gas and Electric Company. The second section (5 to 25 feet) is attached with steel expansion bolts to the concrete wall of the power house, opposite the first section. The first section is made of heavy pine timber, and the second is a 2-by-10 inch hard-pine plank. Both sections are painted white with graduations cut into the wood and painted black.

B. M., mark cut in southwest wall of power house of California Gas and Electric Company, is 18 feet above zero of the gage.

Graduation extends from zero to 25 feet above. Highest water was 23 feet, on March 18, 1907; lowest, -1.6 feet, on September 12-14 and 24-26, 1908. Flood stage is at 14 feet.

COLUMBIA, MISSISSIPPI.

Columbia, Miss. Established October 1, 1904. Is on the Pearl River, 110 miles from its mouth. The width of the river at average low water is 250 feet. The drainage area above the station is 5,339 square miles.

The river gage is attached to the downstream side of the log boom of the Marion Lumber Company, 25 feet from the left bank of the river. It is made of 2 by 12 inch timber, painted white with graduations of brass figures and copper tacks.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. Top of steel casing on southeast side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above mean sea level.

Graduation extends from zero to 30 feet above. Highest water was 24 feet, on April 21, 1874; lowest, 2.8 feet, from October 25 to November 7 and November 16 to 26, all inclusive, 1908. Flood stage is at 18 feet.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C. River observations began October 1, 1891. Is on the Congaree River, 52 miles above its confluence with the Wateree. The distance to Rimini, S. C., on the Santee River, is 63 miles. The width of the river at average low water is 1,112 feet. The drainage area above the station is 7,972 square miles.

The river gage is a chain and weight gage of the United States Geological Survey pattern, and is located on the Gervais Street highway bridge, near the fourth pier from the east side. There is also a brass gage of the Weather Bureau pattern attached to the third pier from the east side.

B. M., top of rail at main line crossing of Atlantic Coast Line at Gervais street, is 102.6 feet above zero of the gage and 222 feet above mean sea level.

Graduation of the chain and weight gage extends from 3 feet below to as many feet above zero as may be necessary, and on the brass gage from 0.4 foot below to 34.7 feet above zero. Highest water was 35.8 feet, at 8.30 p. m. August 27, 1908; lowest, -3 feet, on October 5-11, 1904. Flood stage is at 15 feet.

The river gage consists of two vertical sections. The first section (-2 to 5 feet) was removed on October 22, 1910, to a rock near the left bank of the river in order to secure a better anchorage and for convenience of reading. It is made of 4 by 6 inch black-oak timber, painted white, with graduations cut into the wood and painted black.

The second section (5 to 20 feet) is attached with steel expansion bolts to the concrete wall of the power house, opposite the first section. The first section is made of heavy pine timber and the second is a 2 by 10 inch hard-pine plank. Both sections are painted white with graduations cut into the wood and painted black.

B. M., mark cut in southwest wall of power house of California Gas & Electric Co., is 18 feet above zero of the gage.

Graduation extends from 2 feet below to 20 feet above zero. Highest water was 23 feet, on March 18, 1907; lowest, -1.6 feet, on September 12-14 and 24-26, 1908. Flood stage is at 14 feet.

COLUMBIA, MISSISSIPPI.

Columbia, Miss. Established October 1, 1904. Is on the Pearl River, 110 miles from its mouth. The width of the river at average low water is 250 feet. The drainage area above the station is 5,339 square miles.

The river gage is attached to the downstream side of the log boom of the Marion Lumber Co., 25 feet from the left bank of the river. It is made of 2 by 12 inch timber, painted white with graduations of brass figures and copper tacks.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. B. M., top of steel casing on southeast side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above mean sea level.

Graduation extends from zero to 30 feet above. Highest water was 27.6 feet, on June 5, 1909; lowest, 2.7 feet, on October 31-November 5, 1910. Flood stage is at 18 feet.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C. River observations began October 1, 1891. Is on the Congaree River, 52 miles above its confluence with the Wateree. The distance to Rimini, S. C., on the Santee River, is 63 miles. The width of the river at average low water is 1,112 feet. The drainage area above the station is 7,972 square miles.

The river gage is a chain and weight gage, and is located on the Gervais Street highway bridge, near the fourth pier from the east side. There is also a brass gage of the Weather Bureau pattern attached to the third pier from the east side.

B. M., top of rail at main line crossing of Atlantic Coast Line at Gervais Street, is 102.6 feet above zero of the gage and 222 feet above mean sea level.

Graduation of the chain and weight gage extends from 3 feet below to as many feet above zero as may be necessary, and on the brass gage from 0.4 foot below to 34.7 feet above zero. Highest water was 35.8 feet, at 8.30 p. m., August 27, 1908; lowest, -3 feet, on October 5-11, 1904. Flood stage is at 15 feet.

COLUMBIA, TENNESSEE.

Columbia, Tenn. Established November 1, 1886. Is on the Duck River, 66 miles from its mouth and 76 miles above Johnsonville, Tenn., on the Tennessee River. The width of the river at average low water is 150 feet. The drainage area above the station is 1,207 square miles.

The river gage is attached to the north side of the pier of the Columbia & Nashville Turnpike bridge over Duck River, and is in two sections. The first section (0 to 42 feet) is made of 2 by 14 inch oak timber and is bolted to the stone pier. The second section (42 to 46 feet) is made of 2 by 8 inch white-oak timber. It is extended above and is fastened to the pier with a brace rod. Both sections are painted white with black graduations.

B. M., top of stone step at south entrance to courthouse, is 87.4 feet above zero of the gage and 606.8 feet above mean sea level.

Graduation extends from zero to 46 feet above. Highest water was 45.6 feet, on March 30, 1902; lowest, -1 foot, on October 6, 1910. Flood stage is at 28 feet.

CLINTON, TENN.

The river gage is attached to the south side of the middle pier of the Southern Railway bridge over the Clinch River. It is made of 4 by 10 inch heart pine, painted white, and graduated with copper tacks. Graduation extends from zero to 48 feet above.

B. M., top of rail in front of Southern Railway depot, is 62.6 feet above zero of the gage and 833.2 feet above mean sea level. B. M., base of rail on bridge above gage, is 57.7 feet above zero of the gage and 828.3 feet above mean sea level.

B. M., on Southern Railway bridge over Clinch River, on north bridge head on east side, on top surface of large stone supporting trestle work, 5 inches from south and 5 inches from east edge of stone; bottom of square hole cut in stone, lettered "U. S. B. M." (C. & G. S. Q.), is 61.1 feet above zero of the gage and 831.7 feet above mean sea level.

COCHRANE, ALA.

The river gage is located on the piers of the bridge of the Alabama, Tennessee & Northern Railroad Co. over the Tombigbee River, and is in two sections. The first section (-1 to 8 feet) is bolted to the southeast side of the iron cofferdam of the middle pier, and is made of 2 by 10 inch heart pine, painted white, with graduations burnt into the wood and painted black. The second section (8 to 47 feet) consists of black graduations painted on a 12-inch white surface on the southwest side of the south concrete pier. Graduation extends from 1 foot below to 47 feet above zero.

B. M., top surface of middle pier and top surface of projection at upper end of south pier of above-mentioned bridge, are 47 feet above zero of the gage and 146.8 feet above mean sea level.

COLFAX, CAL.

The river gage, which belongs to the United States Geological Survey, is located on the left bank of the river, 50 feet above the Pacific Gas & Electric Co.'s dam, and is in three sections. It is made of 1 by 4 inch lumber, smoothed on one side, and bolted to 4 by 4 inch redwood supports. The first section (0.0 to 6.4 feet) is bolted to a rock; the second section (6.4 to 12.4 feet) is driven into the ground and supported by a tree; and the third section (12.4 to 16.0 feet) is bolted to a tree. The smoothed surface is painted white, with graduations and figures cut into the wood and painted black. Graduation extends from zero to 16 feet above.

B. M., U. S. G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of the gage, and 1,965 feet above mean sea level.

COLGATE (P. O., DOBBINS), CAL.

The river gage consists of two vertical sections. The first section (-2 to 5 feet) is fastened to a rock near the left bank of the river. It is made of 4 by 6 inch black-oak timber, painted white, with graduations cut into the wood and painted black. The second section (5 to 20 feet) is attached with steel expansion bolts to the concrete wall of the power house, opposite the first section. The first section is made of heavy pine timber and the second is a 2 by 10 inch hard-pine plank. Both sections are painted white, with graduations cut into the wood and painted black. Graduation extends from 2 feet below to 20 feet above zero.

B. M., mark cut in southwest wall of power house of California Gas & Electric Co., is 18 feet above zero of the gage.

COLUMBIA, MISS.

The river gage is attached to the downstream side of the log boom of the Marion Lumber Co., 25 feet from the east bank of the river. It is made of 2 by 12 inch timber, painted white with graduations of brass figures and copper tacks. Graduation extends from zero to 30 feet above.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. B. M., top of steel casing on southeast side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above mean sea level.

COLUMBIA, S. C.

The river gage is a chain and weight gage, and is located on the Gervais Street highway bridge, near the fourth pier from the east side. There is also a brass gage of the Weather Bureau pattern attached to the third pier from the east side. Distance from marker on chain to lower end of weight, 38.5 feet. Graduation of brass gage extends from 0.4 foot below to 34.7 feet above zero.

B. M., top of rail at main line crossing of Atlantic Coast Line at Gervais Street, is 102.6 feet above zero of the gage and 222 feet above mean sea level.

XII

DESCRIPTION OF RIVER GAGES, ETC.

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B. M., top surface of middle pier and top surface of projection at upper end of south pier of above-mentioned bridge, are 47 feet above zero of the gage and 146.8 feet above m. s. l.

COLFAX, CAL.

The river gage, which belongs to the U. S. Geological Survey, is located on the left bank of the river, 50 feet above the Pacific Gas & Electric Co.'s dam, and is in three sections, bolted to 4 by 4 inch redwood supports. The first section (0.0 to 6.4 feet) is bolted to a rock; the second section (6.4 to 12.4 feet) is driven into the ground and supported by a tree; and the third section (12.4 to 16.0 feet) is bolted to a tree. Graduation extends from zero to 16 feet above.

B. M., U. S. G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of the gage, and 1,965 feet above m. s. l.

COLGATE (P. O., DOBBINS), CAL.

The river gage is vertical and in two sections. A new first section, - 2 to 5 feet, was installed November 1, 1914. It is an enameled scale and is attached to a rock near the middle of the stream. The second section 5 to 20 feet, is wooden and is attached to the concrete wall of the power house, opposite the first section. Graduation extends from 2 feet below to 20 feet above zero.

B. M., mark cut in southwest wall of the Pacific Gas & Electric Co. power house, is 18 feet above zero of the gage.

COLUMBIA, MISS.

The river gage is attached to the downstream side of the log boom of the Marion Lumber Co., 25 feet from the east bank of the river. Graduation extends from zero to 30 feet above.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. B. M., top of steel casing on southeast side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above m. s. l.

COLUMBIA, S. C.

A brass river gage is attached to the west face of the third free granite pier, from the east, of the Gervais Street Bridge. The upper 7 feet are attached to a plank resting on top of the pier. Graduation extends from 0.4 foot below to 35 feet above zero. A board gage was installed November 4, 1914, on the east side of the fifth pier from the east abutment, in place of the chain and weight gage. Graduation extends from 2 feet below to 10 feet above zero. This gage is used only for low-water readings.

B. M., top of rail at main line crossing of the A. C. L. at Gervais Street, is 102.6 feet above zero of the gage and 222 feet above m. s. l.

COLUMBIA, TENN.

There are two river gages at this place, both located on the Columbia & Nashville Turnpike Co.'s bridge over Duck River. A tape and weight gage of the Mott pattern is attached to railing of bridge on north side, between footwalk and wagon drive, 3 feet above floor of bridge. It is 75 feet west from the center pier. Distance from zero mark on tape to lower end of weight, 54.3 feet. A wooden gage is attached to the west side of the center pier of the bridge near the northwest corner. Graduation extends from zero to 38 feet above.

B. M., top of stone step at south entrance to courthouse, is 87.4 feet above zero of the gage and 606.8 feet above m. s. l.

COLUMBIA, VA.

The river gage is in five sections. The first section (-0.9 to 9.0 feet) is attached to a locust post in a gully or waste way that is about 100 feet west of the C. & O. Ry. passenger depot. The second section (9 to 15 feet) is installed about 100 feet north of section 1 and in a similar manner. The third section (15 to 17 feet) is spiked to the south side of the wooden framework for water wheel that stands at the head of above-mentioned gully. The fourth section (17 to 30 feet) is spiked to the north side of the wooden framework to which section 3 is attached. The fifth section (30 to 42 feet) is attached to the southeast wooden upright supporting the railroad water tank. This tank is about 125 feet west of C. & O. Ry. passenger depot. Graduation extends from 0.9 foot below to 42 feet above zero.

B. M., top of rail in front of C. & O. Ry. depot, is 29.8 feet above zero of the gage and 206 feet above m. s. l. B. M., southeast bottom edge of capstone of most easterly of two north foundation piers of railway water tank, is 28.9 feet above zero of the gage and 205.1 feet above m. s. l.

COLGATE (P. O., DOBBINS), CAL.

On the Yuba River, 28 miles above Maysville, Cal.

The gage is in two sections. The first section (-2 to 5 feet) is an enameled scale and is attached to a rock near the middle of the stream. The second section (5 to 20 feet) is wooden and is attached to the concrete wall of the power house, opposite the first section.

B. M., mark cut in S. W. wall of the Pacific Gas & Electric Co. power house, is 18 feet above zero of the gage.

COLUMBIA, MISS.

On the Pearl River, 162 miles below Jackson, Miss.

An enameled scale gage was installed, September 9, 1916. It is attached to the downstream side of the log boom of the Marion Lumber Co., 25 feet from the east bank of the river. Graduation extends from 0 to 30 feet.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. B. M., top of steel casing on S. E. side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above m. s. l.

COLUMBIA, S. C.

On the Congaree River, 63 miles above Rinnin, S. C.

A brass gage is attached to the downstream end of the third pier from the E. end of the Gervais Street bridge and is graduated from -0.4 to 34.5 feet. A chain and weight gage was installed October 11, 1916, just E. of the fifth pier from the E. side. Distance from marker on chain to the lower end of the weight, 41.82 feet. The chain and weight gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near N.W. corner of main building of Presbyterian Theological Seminary, Pickens and Blandings Streets, is 186.20 feet above zero of the gage and 303.92 feet above m. s. l.

COLUMBIA, TENN.

On the Duck River, 76 miles above Johnsonville, Tenn.

There are two river gages at this place, both located on the Columbia & Nashville Turnpike Co.'s bridge over Duck River. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape to lower end of weight, 54.3 feet. A wooden gage is attached to the W. side of the center pier of the bridge near the N. W. corner. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, is 87.4 feet above zero of the gage and 606.8 feet above m. s. l.

COLUMBIA, VA.

On the James River, 56 miles above Richmond, Va.

The gage is in five sections. The first section (-0.9 to 9.0 feet) is attached to a locust post in a gully or wasteway that is about 100 feet W. of the C. & O. Ry. passenger depot. The second section (9 to 15 feet) is about 100 feet N. of section 1. The third section (15 to 17 feet) is spiked to the S. side of the wooden framework for water wheel that stands at the head of above-mentioned gully. The fourth section (17 to 30 feet) is spiked to the N. side of the wooden framework to which section 3 is attached. The fifth section (30 to 42 feet) is attached to the S. E. wooden upright supporting the railroad water tank. This tank is about 125 feet west of C. & O. Ry. passenger depot.

B. M., top of rail in front of C. & O. Ry. depot, is 29.8 feet above zero of the gage and 206 feet above m. s. l. B. M., S. E. bottom edge of capstone of most easterly of two N. foundation piers of railway water tank, is 28.9 feet above zero of the gage and 205.1 feet above m. s. l.

COLUMBUS, GA.

On the Chattahoochee River, 51 miles above Eufaula, Ala.

The gage is in two sections. The first section is in two parts. The lower part (0 to 20 feet) is nailed to the downstream side of the brick pier, near the left bank. The upper part (20 to 40 feet) is fastened just above the main brick pier. The second section (30 to 65 feet) is fastened to a pier on the left bank.

COLGATE (P. O., DOBBINS), CAL.

On the Yuba River, 28 miles above Maysville, Cal.

The first section (-2 to 5 feet) is an enameled scale and is attached to a rock near the middle of the stream. The second section (5 to 20 feet) is wooden and is attached to the concrete wall of the power house, opposite the first section.

B. M., mark cut in SW. wall of the Pacific Gas & Electric Co. power house, is 18 feet above zero of gage.

COLUMBIA, MISS.

On the Pearl River, 162 miles below Jackson, Miss.

The gage is attached to the downstream side of the log boom of the Prince Vencer Co., 25 feet from the east bank of the river. Graduation extends from 0 to 29 feet. The gage above 11.9 feet was washed away February 19, 1917, and a temporary gage (18 to 29 feet) was installed December 31, 1917. It is attached to piling at intersection of Beef Alley and Pearl Street, about 400 feet from the first section.

B. M., top of boom to which gage is attached, is 29 feet above zero of gage and 110 feet above mean sea level. B. M., top of steel casing on SE. side of center pier of steel highway bridge over Pearl River, 2 miles S. of Columbia, is 29 feet above zero of gage and 110 feet above m. s. l.

U. S. B. M., square cut into coping at N. end of steps, W. side of courthouse, is 35.4 feet above zero of gage.

COLUMBIA, S. C.

On the Congaree River, 63 miles above Rimini, S. C.

A brass gage is attached to the downstream end of third pier from E. end of Gervais Street bridge and is graduated from -0.4 to 34.5 feet. A chain and weight gage is located just E. of fifth pier from E. side. Distance from marker on chain to the lower end of the weight, 41.82 feet. The chain and weight gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blandings Streets, is 186.20 feet above zero of gage and 303.92 feet above m. s. l.

B. M. (city engineer's), top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above m. s. l. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above m. s. l. U. S. G. S. B. M., crosscut in SW. corner of foundation stone of Columbia Street Ry. powerhouse, near foot of Gervais Street, is 143.91 feet above m. s. l.

COLUMBIA, TENN.

On the Duck River, 76 miles above Johnsonville, Tenn.

There are two river gages at this place, both located on the C. & N. T. Co.'s bridge. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape to lower end of weight, 51.3 feet. A wooden gage is attached to the W. side of the center pier of the bridge near the NW. corner. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, is 87.4 feet above zero of gage and 606.8 feet above m. s. l.

COLUMBIA, VA.

On the James River, 56 miles above Richmond, Va.

A chain and weight gage was installed on the highway bridge just below the C. & O. station, November 14, 1917. Distance from marker on chain to lower end of weight, 52.38 feet.

B. M., base of rail in front of C. & O. station, is 32.65 feet above zero of gage and 205.5 feet above m. s. l. B. M., top of copper plug set vertically into the top of the second pier from Columbia side, 3.2 inches from E. end and 7.2 inches from S. face of pier, is 40.07 feet above zero of gage and 212.91 feet above m. s. l. Top of wheel guard stone at intersection of Main and another (not named) street, about 300 feet N. of station, is 40.8 feet above low water of 1892.

Levels run November 14, 1917, showed that the 10-foot mark of the first section of the old gage was 182.86 feet above m. s. l., instead of 186.2 feet as previously given. The second section was found to read 0.4 foot higher than the first section, but the observer stated that this was known and taken into consideration in reading the gage. The chain and weight gage was set to read with the low section of the old gage.

XVI

CLOVERPORT, KY.

On the Ohio River, 79 miles above Evansville, Ind.

The gage is located about 1 mile below the railroad station. Section 1, 0 to 5 feet, is on the concrete pier at the foot of the inclined section. Section 2, 5 to 39 feet, is inclined and consists of an inverted steel rail embedded in concrete. Section 3, 39 to 64 feet, is vertical, made of channel iron, fastened to the concrete dry of the L. H. & St. L. Ry.

B. M., U. S. C. & G. S. high-water mark on Fisher's drug store, corner of Second and Main Streets, is 7 feet above zero of gage and 416.63 feet above m. s. l.

CLYDE, KANS.

On the Republican River, 32 miles above Clay Center, Kans.

A chain and weight gage is bolted to end of floorbeam of M. P. bridge, upstream side. Distance from marker on chain to lower end of weight, 29.45 feet.

B. M. No. 1, U. S. C. & G. S. bronze tablet on bridge seat at E. end of bridge, NE. corner, is 21.52 feet above zero of gage. B. M. No. 2, cross cut in NW. corner of concrete shoulder of W. concrete abutment, 7.5 feet upstream from inside of upstream rail, Bridge 74, is 25.67 feet above zero of gage and 1,292.62 feet above m. s. l.

COCHRANE, ALA.

On the Tombigbee River, 103 miles above Demopolis, Ala.

The gage is located on the piers of bridge of A. T. & N. Ry. Co. The first section, -1 to 8 feet, is bolted to the SE. side of the iron cofferdam of the middle pier. The second section, 8 to 47 feet, is painted on S. side of S. concrete pier.

B. M., top surface of middle pier and top surface of projection at upper end of S. pier of above-mentioned bridge, are 47 feet above zero of gage and 146.8 feet above m. s. l.

COLFAX, CALIF. (U. S. C. & G. S. GAGE).

On the Bear River.

The gage is located on left bank of river, 50 feet above the P. G. & E. Co.'s dam. Section 1, 0.0 to 6.4 feet, is bolted to a rock. Section 2, 6.4 to 12.4 feet, is driven into the ground and supported by a tree. Section 3, 12.4 to 16.0 feet, is bolted to a tree.

B. M., U. S. C. & G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of gage, and 1,965 feet above m. s. l.

COLGATE (P. O., DOBBINS), CALIF.

On the Yuba River, 28 miles above Marysville, Calif.

Section 1, -2 to 5 feet, is an enameled scale and is attached to a rock near the middle of the stream. Section 2, 5 to 20 feet, is wooden and is attached to a concrete wall of the powerhouse, opposite the first section.

B. M., mark cut in SW. wall of the Pacific Gas & Electric Co. powerhouse, is 18 feet above zero of gage, and about 540 feet above m. s. l.

COLUMBIA, MISS.

On the Pearl River, 162 miles below Jackson, Miss.

The gage is attached to the downstream side of the log boom of the Price Veneer Co., 25 feet from the left bank of the river. Graduation extends from 0 to 29 feet. The gage above 14.9 feet was washed away February 19, 1917, and a temporary gage, 18 to 29 feet, was installed December 31, 1917. It is attached to pile at intersection of Beef Alley and Pearl Street, about 400 feet from the first section.

B. M., top of boom to which gage is attached, is 29 feet above zero of gage and 110 feet above m. s. l. B. M., top of steel casing on SE. side of center pier of steel highway bridge over Pearl River, 2 miles S. of Columbia, is 29 feet above zero of gage and 110 feet above m. s. l.

U. S. B. M., square cut into coping at N. end of steps, W. side of courthouse, is 35.4 feet above zero of gage.

COLUMBIA, S. C.

On the Congaree River, 63 miles above Rimini, S. C.

A brass gage is attached to the downstream end of third pier from E. end of Gervais Street bridge and graduated from -0.4 to 34.5 feet. A chain and weight gage is located just E. of fifth pier from E. side. Distance from marker on chain to the lower end of the weight, 41.82 feet. The chain and weight gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blandings Streets, is 186.20 feet above zero of gage and 303.92 feet above m. s. l.

B. M. (city engineer's), top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above m. s. l. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above m. s. l. U. S. G. S. B. M., cross cut in SW. corner of foundation stone of Columbia Street Ry. powerhouse, near foot of Gervais Street, is 143.91 feet above m. s. l.

COLUMBIA, TENN.

On the Duck River, 76 miles above Johnsonville, Tenn.

There are two river gages at this place, both located on the C. & N. T. Co.'s bridge. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape to lower end of weight, 54.3 feet. A wooden gage is attached to the W. side of the center pier of the bridge near the NW. corner. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, is 87.4 feet above zero of gage and 606.8 feet above m. s. l.

COLUMBIA, VA.

On the James River, 56 miles above Richmond, Va.

A chain and weight gage is located on the highway bridge just below the C. & O. station. Distance from marker on chain to lower end of weight, 52.38 feet.

B. M., base of rail in front of C. & O. station, is 32.65 feet above zero of gage and 205.5 feet above m. s. l. B. M., top of copper plug set vertically into the top of the second pier from Columbia side, 3.2 inches from E. end and 7.2 inches from S. face of pier, is 40.07 feet above zero of gage and 212.91 feet above m. s. l. Top of wheel guard stone at intersection of Main and another (not named) street, about 300 feet N. of station, is 40.8 feet above low water of 1892.

COLUMBUS, GA.

On the Chattahoochee River, 51 miles above Eufaula, Ala.

Section 1, 0 to 20 feet, is nailed to downstream side of brick pier, near left bank. Section 2, 20 to 40 feet, is fastened just above the main brick pier. Section 3, 30 to 65 feet, is fastened to pier on left bank.

Graduations from 0 to 20 feet are in feet and tenths, and the rest of the gage in feet and fourths. The lower portion terminates at 20 feet and the second portion begins at the same height with 21 feet; and the gage therefore reads 1 foot too high for all points above 20 feet.

B. M. U. S. G. S., at W. entrance to post office building, aluminum tablet stamped "251 Adj., 1903," is 65.02 feet above zero of gage and 250.27 feet above m. s. l.

B. M. U. S. G. S., cross chiseled on shoreward face of left bank viaduct abutment of M. & G. Ry. bridge, about 1 foot above ground, is 46.98 feet above zero of gage and 232.23 feet above m. s. l. B. M. U. S. G. S., cross chiseled on downstream shoreward corner top of rock of left bank pier of railroad bridge, is 44.44 feet above zero of gage and 229.69 feet above m. s. l.

B. M., U. S. G. S., downstream shoreward corner top of second stone pier from left bank, is 43.10 feet above zero of gage and 228.35 feet above m. s. l. B. M., U. S. G. S., cross chiseled on top of lower tension rod of railroad bridge about 2 feet shoreward from second pier from left bank, is 46.10 feet above zero of gage and 231.35 feet above m. s. l.

COLUMBUS, MISS.

On the Tombigbee River, 45 miles above Cochrane, Ala.

The gage is attached to E. side of channel pier of S. Ry. bridge. The first section, -4 to 0 feet, is fastened to concrete base of pier. The second section, 0 to 38.5 feet, is fastened to brick portion of pier.

B. M., copper plug in tree at SE. corner of First Street and Second Avenue, is 17.9 feet above zero of gage and 153.6 feet above m. s. l. B. M., top of rail in front of S. Ry. station, is 55.2 feet above zero of gage and 190.9 feet above m. s. l.

COLUMBUS, OHIO.

On the Scioto River, 27 miles above Circleville, Ohio.

The gage was moved June 20, 1918, to W. end of S. face of S. pier of H. V. bridge a short distance above Mound Street. There is a dam below the gage. Graduation extends from 0 to 24 feet.

COLFAX, CALIF. (U. S. G. S. GAGE). XVII

On the Bear River.

The gage is located on left bank of river, 50 feet above the P. G. & Co.'s dam. Section 1, 0.0 to 6.4 feet, is bolted to a rock. Section 2, 6.4 to 12.4 feet, is driven into the ground and supported by a tree. Section 3, 12.4 to 16.0 feet, is bolted to a tree.

B. M., U. S. G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of gage, and 1,965 feet above msl.

COLGATE (P. O., DOBBINS), CALIF.

On the Yuba River, 28 miles above Marysville, Calif.

Section 1, -2 to 5 feet, is an enameled scale and is attached to a rock near the middle of the stream. Section 2, 5 to 20 feet, is wooden and is attached to a concrete wall of the power house, opposite the first section.

B. M., mark cut in SW. wall of the Pacific Gas & Electric Co. power house, is 18 feet above zero of gage, and about 540 feet above msl.

COLUMBIA, MISS.

On the Pearl River, 162 miles below Jackson, Miss.

The gage, 0 to 14.9 feet, is attached to the downstream side of the log boom of the Price Veneer Co., 25 feet from the east bank of the river. Section 11 to 29 feet, is attached to a post about 400 feet upstream from the low section, at Beef Alley and Pearl Street.

B. M., spike in willow tree, 19.5 feet upstream from second pile from bank at low section of gage is 19.34 feet above zero of gage. B. M., nail in cypress tree about 20 feet upstream from high section, is 20.4 feet above zero of gage.

B. M., top of steel casing on SE. side of center of pier of steel highway bridge over Pearl River, 2 miles S. of Columbia, is 29 feet above zero of gage and 110 feet above msl.

U. S. B. M., square cut into coping at N. end of steps, W. side of courthouse, is 35.4 feet above zero of gage.

COLUMBIA, S. C.

On the Congaree River, 63 miles above Rimini, S. C.

A brass gage is attached to the downstream end of third pier from E. end of Gervais Street bridge and is graduated from -0.4 to 34.5 feet. A chain and weight gage is located just E. of fifth pier from E. side. Distance from marker on chain to the lower end of the weight, 41.82 feet. The chain and weight gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blandings Streets, is 186.20 feet above zero of gage and 303.92 feet above msl.

B. M. (city engineer's), top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above msl. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above msl. U. S. G. S. B. M., cross cut in SW. corner of foundation stone of Columbia Street Ry. power house, near foot of Gervais Street, is 143.91 feet above msl.

COLUMBIA, TENN.

On the Duck River, 80 miles above Johnsonville, Tenn.

There are two river gages at this place, both located on the C. & N. T. Co.'s bridge. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape to lower end of weight, 54.3 feet. A wooden gage is attached to the W. side of the center pier of the bridge near the NW. corner. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, is 87.4 feet above zero of gage and 606.8 feet above msl.

COLUMBIA, VA.

On the James River, 56 miles above Richmond, Va.

A chain gage is located on the highway bridge just below the C. & O. station. Distance from marker on chain to lower end of weight, 52.38 feet.

B. M., base of rail in front of C. & O. station, is 32.65 feet above zero of gage and 205.5 feet above msl. B. M., top of copper plug set vertically into the top of the second pier from Columbia side, 3.2 inches from E.

B. M. No. 1, U. S. G. S., bronze tablet on bridge seat of E. end of bridge, NW. corner, upstream from bridge, is 21.50 feet above zero of gage. B. M. No. 2, cross cut in NW. corner of concrete shoulder of W. concrete abutment, 7.5 feet upstream from inside of rail of bridge No. 74, is 25.67 feet above zero of gage and 1,292.62 feet above msl. B. M. No. 3, cross cut in top of bridge floor beam, adjacent to gage box, is 26.60 feet above zero of gage.

COCHRANE, ALA.

On the Tombigbee River, 86 miles above Demopolis, Ala.

Gage is located on piers of bridge of A. T. & N. Ry. Co. First section, - 1 to 8 feet, is bolted to SE. side of iron cofferdam of middle pier. Second section, 8 to 47 feet, is painted on SW. side of S. concrete pier.

B. M., U. S. E., top surface of middle pier and top surface of projection at upper end of S. pier of above-mentioned bridge, are 47 feet above zero of gage and 146.8 feet above msl.

COLFAX, CALIF. (U. S. G. S. GAGE).

On the Bear River.

Gage is located on left bank of river, 50 feet above P. G. & E. Co.'s dam. Section 1, 0.0 to 6.4 feet, is bolted to rock. Section 2, 6.4 to 12.4 feet, is driven into ground and supported by tree. Section 3, 12.4 to 16.0 feet, is bolted to tree.

B. M., U. S. G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of gage, and 1,965 feet above msl.

COLGATE (P. O., DOBBINS), CALIF.

On the Yuba River, 28 miles above its mouth, at Marysville, Calif.

Section 1 of gage, - 2 to 5 feet, is of enameled steel, attached to rock near middle of stream. Section 2, 5 to 20 feet, is wooden and is attached to concrete wall of power house, opposite first section.

B. M., U. S. G. S., mark cut in SW. wall of Pacific Gas & Electric Co. power house, is 18 feet above zero of gage and about 540 feet above msl.

COLUMBIA, MISS.

On the Pearl River, 132 miles below Jackson, Miss.

Section 1 of gage, 0 to 14.9 feet, is attached to downstream side of log boom of Price Veneer Co., 25 feet from left bank of river. Section 2, 11 to 29 feet, is attached to post about 400 feet upstream from low section, at Beef Alley and Pearl Street.

B. M., spike in willow tree, 19.5 feet upstream from second pile from bank at low section of gage is 19.34 feet above zero of gage. B. M., nail in cypress tree about 20 feet upstream from high section, is 20.4 feet above zero of gage, and 101.4 feet above msl.

B. M., top of steel casing on SE. side of center of pier of steel highway bridge over Pearl River, 2 miles S. of Columbia, is 29 feet above zero of gage and 110 feet above msl.

B. M., U. S. E., 1915, square cut into coping at N. end of steps, W. side of courthouse, is 35.4 feet above zero of gage.

COLUMBIA, S. C.

On the Congaree River, 52 miles from its mouth and 63 miles above Rimini, S. C., on the Santee River.

Brass gage is attached to downstream end of third pier from E. end of Gervais Street bridge and is graduated from - 0.4 to 34.5 feet. A chain gage is located just E. of fifth pier from E. side. Distance from marker on chain to lower end of weight, 41.82 feet. Chain gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blanding Streets, is 186.20 feet above zero of gage and 303.92 feet above msl.

B. M. (city engineer's), top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above msl. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above msl. B. M., U. S. G. S., cross cut in SW. corner of foundation stone of Columbia Street Ry. power house, near foot of Gervais Street, is 143.91 feet above msl.

COLUMBIA, TENN.

On the Duck River, 66 miles from its mouth and 80 miles above Johnsonville, Tenn.

There are two gages at this place, both located on Maury County highway bridge. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape on lower end of weight, 51.3 feet. Wooden gage is attached to W. side of center pier of bridge. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, has been removed. B. M., U. S. G. S., chiseled mark on right side of post, 119 feet from left end of bridge, is 53.71 feet above zero of gage and (calculated) 573.1 feet above msl.

COLUMBIA, VA.

On the James River, 63 miles above Richmond, Va.

A chain gage is located on highway bridge just below C. & O. station. Distance from marker on chain to lower end of weight, 52.38 feet.

Section 1 of gage, -2 to 5 feet, of enameled steel, attached to rock near middle of stream. Section 2, 5 to 20 feet, wooden, attached to concrete wall of power house, opposite first section.

B. M., U. S. G. S., mark cut in SW. wall of Pacific Gas & Electric Co. power house, is 18 feet above zero of gage and about 540 feet above msl.

COLUMBIA, MISS.

On Pearl River.

New enameled steel gage installed January 1, 1922. Attached to E. side of wing wall on upstream side of N. O. & G. N. R. R. bridge, about 125 feet along wall from bridge, and about 1½ miles upstream from old gage. Wing wall made of creosoted piling. Graduation from -2 to 30 feet.

B. M., N. O. & G. N. R. R., Lester, 1921, boat spike driven near N. end of cap into W. pile pier of gage bridge, is 0.84 foot above B. M. at Marion County courthouse in Columbia, 36.24 feet above zero of gage and 117.24 feet above msl. B. M., U. S. E., 1915, at courthouse in Columbia, 2½-inch square cut in limestone block coping at N. end of steps entering W. side, is 35.4 feet above zero of gage and 116.4 feet above msl. Authority for elevation of gage zero, G. & S. I. R. R. Co.

Section of old gage, 11 to 29 feet, near sewer abutment at intersection of Beef Alley and Pearl Street. Zero of new gage at same level as that of old one, but comparisons thus far made show readings at new gage about 0.1 foot higher.

COLUMBIA, S. C.

On Congaree River, 52 miles from its mouth and 58 miles above Rimini, S. C., on Santee River.

Brass gage attached to downstream end of third pier from E. end of Gervais Street bridge and graduated from -0.4 to 34.5 feet. Short-box chain gage just E. of fifth pier from E. side. Chain length, 41.82 feet. Chain gage used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blanding Streets, is 186.20 feet above zero of gage and 303.92 feet above msl.

B. M. (city engineer's), cross cut on top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above msl. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above msl. B. M., U. S. G. S., cross cut in SW. corner of foundation stone of Columbia Street Ry. power house, near foot of Gervais Street, is 143.91 feet above msl.

Dam at Parr Shoals, 23 miles upstream, and U. S. dam 2 miles below affect stages somewhat.

COLUMBIA, TENN.

On Duck River, 66 miles from its mouth and 81 miles above Johnsonville, Tenn., on Tennessee River.

Two gages at this place, both on Maury County highway bridge. Mott gage attached to railing of bridge on N. side. Tape length, 54.3 feet. Wooden gage attached to W. side of center pier of bridge. Graduation from 0 to 38 feet.

B. M., U. S. G. S., chiseled mark on right side of post, 119 feet from left end of bridge, is 53.71 feet above zero of gage and (calculated) 573.1 feet above msl.

Dam of Southern Cities Power Co., three-fourths mile upstream affects low stages. Covered at 18 feet.

COLUMBIA, VA.

On James River at mouth of Rivanna River, 63 miles above Richmond, Va.

Short-box chain gage attached to downstream side of highway bridge just below C. & O. station. Chain length, 52.38 feet.

B. M., base of rail in front of C. and O. Ry. station is 32.65 feet above zero of gage and 205.5 feet above msl. B. M., top of copper plug set vertically into top of second pier from Columbia side of highway bridge, 3.2 inches from E. end and 7.2 inches from S. face of pier, is 40.058 feet above zero of gage and 212.91 feet above msl.

COLUMBUS, GA.

On Chattahoochee River, 50 miles above Eufaula, Ala.

Gage attached to first channel pier from left bank of Mobile & Gerard Railway bridge. Graduation from 0 to 39 feet.

B. M., U. S. G. S., at W. entrance to post-office building, aluminum tablet stamped "251 ADJ. 1903," 65.02 feet above zero of gage and 250.27 feet above msl. B. M., U. S. G. S., cross chiseled on shoreward face of left-bank viaduct abutment of M. & G. Ry. bridge, about 1 foot above ground, is 46.93 feet above zero of gage and 232.23 feet above msl.

COLUMBUS, MISS.

On Tombigbee River, 49 miles above Cochrane, Ala.

Gage attached to E. side of channel pier of S. Ry. bridge. Section 1, -4 to 0 feet, fastened to concrete base of pier; section 2, 0 to 38.5 feet, to brick portion of pier.

B. M., copper plug in tree at SE. corner of First Street and Second Avenue, is 17.9 feet above zero of gage and 153.6 feet above msl. B. M., top of rail in front of S. Ry. station is 55.2 feet above zero of gage and 153.6 feet above msl.

Circleville, Ohio..... All readings of 10.0 and below should be corrected as follows: From July 23, 1924, to Oct. 11, 1926, subtract 0.1 foot; from Oct. 12, 1926, to Dec. 31, 1928, subtract 0.2 foot; from Jan. 1, 1929, to Dec. 31, 1930, subtract 0.3 foot. Readings from 10.1 to 20.0 should be corrected as follows: From June 1, 1925, to May 8, 1929, subtract 0.1 foot; from May 9, 1929, to Feb. 8, 1932, subtract 0.2 foot.

Columbia, S.C..... All records made from Sept. 1, 1929, to Dec. 31, 1932, should be corrected according to the following table:

	10 feet and below	10.1 to 20.0 feet	20.1 to 30.0 feet	30.0 feet and over
Subtract 0.1 foot..	Sept. 1, 1929–Sept. 30, 1930.	Jan. 1, 1930–Apr. 15, 1931.	June 1, 1930–Mar. 31, 1932.	Apr. 15, 1931–Dec. 31, 1932.
Subtract 0.2 foot..	Oct. 1, 1930–Oct. 31, 1931.	Apr. 16, 1931–July 31, 1932.	Apr. 1, 1932–Dec. 31, 1932.	
Subtract 0.3 foot..	Nov. 1, 1931–Nov. 30, 1932.	Aug. 1, 1932–Dec. 31, 1932.		
Subtract 0.4 foot..	Dec. 1, 1932–Dec. 31, 1932.			

Columbia, Va..... All readings for the period Jan. 1, 1918, to Dec. 31, 1929, should be corrected by subtracting the following amounts (in all cases the amounts given are in feet):

Year	10 and lower	10.1 to 20.0	Above 20	Year	10 and lower	10.1 to 20.0	Above 20
1918.....	0.1	0.1	0.0	1924.....	0.6	0.5	0.3
1919.....	.2	.1	.1	1925.....	.7	.5	.4
1920.....	.3	.2	.1	1926.....	.8	.6	.4
1921.....	.3	.3	.2	1927.....	.8	.7	.5
1922.....	.4	.3	.2	1928.....	.8	.7	.5
1923.....	.5	.4	.3	1929.....	.8	.7	.5

Columbus, Miss..... To reduce past records to present gage datum add 4.0 feet to all readings prior to Jan. 1, 1933.

Cotter, Ark..... Add 0.1 foot to all readings below 3.9 feet from Nov. 5, 1930, to Dec. 31, 1932.

Cotulla, Tex..... From July 26, 1927, to Oct. 19, 1928, add 1.2 feet; from Oct. 20, 1928, to Dec. 31, 1929, add 1.4 feet.

Covington, Ind..... The readings for Nov. 11, 1929, and for the period Dec. 1 to 14, 1929, should be corrected by the addition of 3.5 feet. The mean stage for December 1929 should be 11.4 feet.

Dam No. 48, Ohio River.. Subtract 7.1 feet from Jan. 1, 1922, to Dec. 31, 1923.

Del Rio, Tex..... Gage readings made prior to July 1, 1932, are not comparable with present gage readings.

Des Moines, Iowa..... Subtract 0.9 foot previous to Jan. 1, 1908. From May 10, 1930, to Dec. 31, 1930, subtract 0.1 foot.

Dubuque, Iowa..... Subtract 1.0 foot from all published readings from beginning of records to Dec. 31, 1932.

El Reno, Okla..... Add 2.0 feet to all readings made prior to Dec. 31, 1932.

Eugene, Oreg..... Subtract 0.1 foot from readings 6.0 to 13.0 feet, and add 0.1 foot to readings above 25.0 feet from Nov. 16, 1913, to Dec. 31, 1915. Correct all readings of 6.0 feet and lower, for the period Sept. 1, 1920, to Dec. 31, 1929, by subtracting 0.2 foot.

Fayetteville, N.C..... Numerous changes in zero plane between Oct. 17, 1909, and Dec. 31, 1930, make the list of corrections long and complicated. Corrected readings on file in Office of Chief of Weather Bureau, Washington, D.C., and in Weather Bureau office, Raleigh, N.C.

Fort Ripley, Minn..... Staff gage zero was 1,134.71 feet above m.s.l. (1912 adj.) on May 16, 1929. Staff gage zero was 1,135.11 feet above m.s.l. (912 adj.) on Aug. 15, 1904; or the readings were 0.40 foot higher on May 16, 1929, than they were on Aug. 15, 1904, provided the elevation of b.m. 307/3 (cap on pipe) had not changed in the meantime. If the b.m. has remained constant the error of 0.40 foot was probably introduced in repairing or replacing the gage, and may have been introduced all at one time, or may have been cumulative, as gage was repaired or renewed several times.

Fort Smith, Ark..... Gage readings for the period Nov. 20, 1910, to Feb. 15, 1911, considered doubtful and not used. Subtract 0.2 foot from readings below 10.0 feet from Oct. 1, 1913, to Dec. 31, 1917.

Franklinton, La..... All readings below 3.4 feet prior to Nov. 7, 1924, are unreliable. Add 0.4 foot to all readings below 10.7 feet prior to July 26, 1929, except to estimated readings in June, July, August and September 1928.

Gadsden, Ala..... The following stages (all in 1893) should be substituted for those previously published: July 10, 1.2; Aug. 10, 2.0; Sept. 10, -0.2; Oct. 10, 0.0; Nov. 10, -0.7; Dec. 10, 0.9. Readings below 3.0 feet in 1927, 1928, and 1929 considered unreliable.

Greenwood, Miss..... Subtract 0.1 foot from all readings 10.0 feet and below for the period Jan. 1, 1932, to Dec. 31, 1932. Subtract 0.1 foot from all readings above 10.0 feet for the period July 1, 1932, to Dec. 31, 1932.

Harrisburg, Pa..... Gage was located at waterworks, ¼ mile upstream from present gage, until July 18, 1904. Both gages were set to the same zero plane.

Hendricks Bridge, Oreg... Add 1.0 foot in April 1919. Subtract 1.1 feet from Sept. 5, 1928, to Dec. 31, 1929.

Huntingdon, Pa..... Add 3.0 feet previous to 1895. Add 1.0 foot to readings on Aug. 6, and from Aug. 8 to 31, 1895. Readings on Oct. 31, 1907, should be 3.2 and on Nov. 1, 1907, 3.3. In vol. XII, p. 115, make highest stage 22.5 on June 1, 1889, and lowest stage 2.4 on Oct. 2, 1891, and subsequent dates. Records prior to Apr. 17, 1931, not comparable with subsequent ones.

Kermit, W.Va..... Subtract 0.2 foot from all readings from Dec. 21, 1928, to July 13, 1929, from Aug. 10, 1929, to Aug. 25, 1930, from Oct. 23, 1930, to Dec. 31, 1930. Subtract 0.3 foot from all readings from July 14, 1929, to Aug. 9, 1929, and from Aug. 26, 1930, to Oct. 22, 1930.

Kingston, Tenn..... Add 0.1 foot to all readings from Nov. 12, 1929, to Dec. 31, 1930.

Knights Landing, Calif... Add 5.0 feet prior to Dec. 1, 1906; add 12.0 feet from Dec. 1, 1906, to Dec. 31, 1931.

Knockville, Tenn..... Readings made prior to July 1, 1929, are not comparable with subsequent readings.

La Crosse, Wis..... 1873, add 1.0 foot; 1874 to 1884, subtract 1.3 feet; Jan. 1, 1885 to Sept. 30, 1891, subtract 1.2 feet.

Lansing, Iowa..... Add 0.3 foot to all readings from July 16, 1912, to Nov. 28, 1919; subtract 0.2 foot from Mar. 20, 1920, to Feb. 23, 1922; subtract 0.1 foot from Mar. 19, 1926, to Apr. 30, 1930; add 0.6 foot from May 1, 1930, to Nov. 30, 1930.

Lock No. 4, Charleroi, Pa. Add 1.53 feet to all readings made prior to Jan. 1, 1915. Subtract 1.67 feet from all readings between Jan. 1, 1915, and Dec. 31, 1931.